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CONTENTS.

No.		Page.
1.	The more important "Minor Forest Produce" of the Madras Presidency. — By, *G. Viswanatham.*	
2.	A little red seed — the Malingerer's friend. — By, *Alyson Minchin, I. F. S.* ...	18
3.	How the Walayar rogue elephant was shot. — By, *R. H. M.* ...	19
4.	Camp life. — By, *L. R. Sharma.*	23
5.	EXTRACTS :	25
	The Timber trades of India ... 25	
	Kiln drying of wood with ozonised air ... 26	
	Encroachment of the Sahara 27	
	Daylight and feeding of birds... ... 27	
	Welwyn Railway smash; how teak panels withstood shock 28	
	How furniture fashions have been changed ... 28	
	Action on an international scale to counter attacks on wood... 30	
	Empire hardwoods 32	
	The significance of soil-texture in forestry, and its determination by a rapid field method 33	
	Effects of the 1934 drought in the United States 37	
	Symbiotic association between flies and Nematodes in galls of Eucalyptus trees ... 38	
	Teaching the value of forests ... 39	
	Longevity of fungi 40	
6.	COLLEGE NOTES	41
	(1) Camp Notes — Walayar. — By, *N. S. Pillai.*	
	(2) Athletic Club — By, *R. Radhakrishnan.*	
7.	Departmental Notifications	47

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THE

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* The more important " Minor Forest Produce " of the Madras Presidency.

By, G. Viswanatham, B. A.,
Curator, Forest Museum, Coimbatore.

Forest produce is technica two main classes: " Major Forest Produc imber and firewood, and " Minor Forest est. The latter consists of a great variety of articles, chief among which are: Tans and dyes, gums, oleo-resins, drugs, spices, grasses, fibres and flosses, oil-seeds, rubber, minerals, and animal products such as lac, silk, honey, wax, hides, horns, ivory etc:

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The collection of such produce is restricted to those kinds which it pays to collect, and the right of collection is generally leased to contractors, except in certain localities like Sriharikota in Nellore district, and the Nilgiris, where the produce is collected departmentally to afford

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* A paper read before the Coimbatore Branch of the Madras Geographical Association.

employment to the local hill-tribes. Appendix A gives a list of the more important kinds of produce collected in this Presidency, and the prices that ruled in a particular month, in the markets specified. As the prices fluctuate, such quotations are obtained monthly and circulated (to the officers of the Forest Department and to the Director of Industries, Madras). Appendix B is a list of the Forest Divisions of the Presidency with the chief minor produce actually collected, or worth a collection.

During recent years, there has been an opening up of our forests with a greater net-work of roads to facilitate exploitation of the produce, and it is hoped that ere long, with still greater facilities in this direction, it would be possible to achieve a fuller utilization, and a more intensive working. The Forester's erst-while slogan, " Woodman, spare that tree, " will run, " Use all the tree, and grow more ! " We hear so much now-a-days about diversified farming as a solution for the farmer's ills. Diversified utilization of the forest products would also go a long way in making forestry more profitable. It is only when every part of every tree is put to its best use that forestry becomes a truly profitable concern.

To gain this ideal, we must more extensively exploit our resources, and bring to an irreduceable minimum all possible sources of wastage in collection, conversion, transport. etc. An avoidance of wastage in collection in the case of the ' Major produce ' is intricately bound up with the question of improved methods of extraction and transport*. In regard to " Minor Produee " in particular, wastage results not merely from faulty methods of

* For South Indian conditions, however, experiments have shown that, after all, dragging by elephants and transport by bullock-carts are the cheapest and best suited ; but the introduction and extensive use of the Indian bullock-cart modernised by the Dunlop Rubber Co. (India) Ltd. who have recently produced special pneumatic

collection, but by our failure to exploit all potential sources of produce in our forests. An instance is furnished by the pseudo-gum exuded from the tree *Sterculia urens.* This produce was, till recently not systematically collected in many parts of India, owing to our ignorance of its properties and value. Its collection in 1932–33 for the first time in the Central Provinces alone, fetched a revenue of no less than Rs. 9,000 with prospects of a further increase in the future! Revenue from such sources was locked up till recently, owing to an insufficient knowledge of our assets.

True, in America and elsewhere there is a fuller utilization by invoking the aid of the latest discoveries of science. Saw-dust is converted into 'sacchulose' useful for the distiller and the agriculturist. Wood chips are exploded into millions of fibres and converted into "synthetic lumber." Wood-cellulose is made to yield artificial silk Recently a new packing material has come forward in the form of wood-fibre blanketing or matting, from waste lumber. Transparent sheets of cellulose are now being used for making laminated "glass" which is bullet-proof. Chemists hope to get glucose from wood, and very soon our breakfast will consist of material got from pieces of wood! But one must not be over-optimistic in the case of a country like India, where the conditions are very different, and do not yet warrant the adoption of such mechanical or scientific methods in forestry. Great caution has to be exercised in starting forest industries in particular. For instance, the production of "power alcohol" from Indian softwood was claimed to be possible

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rubber tyres and roller bearing hubs, are worth a trial. It is claimed that with such an equipment, as much as 100% greater loads can be carried with less tractive effort, besides resulting in considerable savings in road-repairs that could be utilised for the opening up of our forests by more roads.

and to prove a paying industry in India; but a recent note on this by the Imperial Forest Economist gives us a rude shock, and proves that the profitable manufacture of power alcohol from India's forests is no more than a golden dream!

Before we review the items of the minor forest produce, it would be well to know some statistics on the revenue from them. Out of a total revenue of Rs. 39.43 lakhs for 1933–34, minor forest produce fetched Rs. 5,54,703, as against Rs. 5,67,473 in 1932–33. The decrease in revenue occurred mainly in the Kurnool district, due to want of demand for slab quarries, "tangedu" (*Cassia auriculata*) and "Rela" (*Cassia fistula*) barks, and to a fall in tree tapping fees. In 1932–33, in Anantapur district alone there was a fall of Rs 4,784 in the lease amount for "tangedu" bark. "Tumki" (*Diospyros melanoxylon*) leaves—for "beedies" fetched about Rs. 4000 in Upper Godaveri Division. In July 1933, 400 candies of Nux-vomica seeds were sold by the Depertment @ Rs. 10/- per candy, and 300 candies of last year's collection were auctioned for Rs. 11-4-0 per candy. Further details of prices will be found in Appendix A.

We will next briefly consider the very important items of the minor forest produce of this Presidency:

I. Grass:

This constitutes an important factor in maintaining the agricultural prosperity of any country, particularly of India. Of recent years, attempts made in the Ootacamund circle to introduce on a large scale better species like "Kolukattai" (*Pennisetum cenchroides*) and "Kikyu" (*Pennisetum clandestinum*) grasses, met with varying degrees of success. The 'Kolukattai' gave better results. The artificial introduction of better species of

grass with a view to improvement of forest grazing in this presidency is perhaps never likely to be a paying proposition.

The Lemon grass oil of commerce, used in perfumery and as an antidote for mosquito bites, is yielded by *Cymbopogon citratus*. The roots of 'Khus-Khus' grass (*Cymbopogon muricatus*) yield also a fragrant oil.

II. Manure leaves :

The removal of leaves for manure is allowed in places where people are unable to do without them. It has been the recognised policy of Government gradually to wean the ryots from the habit of depending on the forests for this supply, and to encourage them to grow their requirements on their own lands, or to use other kinds of manure. In a certain year, in two ranges in the Madura district, there was a demand for no less than 43,000 cartloads of manure leaves !

III. Fibres and flosses :

Fibres of value are yielded by the inner-bark of certain woody species, and by certain parts of some fruits, and leaves. The chief fibre-yielding woody plants hail from the families *Malvaceae*, *Sterculiaceae*, *Tiliaceae*, *Leguminoseae*, *Asclepiadaceae*, and *Urticaceae*. The bark of *Sterculia villosa* yields fibre used for elephant-dragging ropes. *Spatholobus roxburghii*, *Hardwickia binata*, *Bauhinia racemosa*, *Acacia leucophloea*, *Ougeinia dalbergioides*, *Girardina heterophylla* (*Nilghiri nettle*), *Antiaris toxicaria* also yield strong fibres. The inner back of *Antiaris* (Upas tree) is often beaten out into mats and bags. The fruits of *Eriodendron pentandrum*, Kurz, yield the true 'Kapok' floss, while those of *Cochlospermum*, and *Bombax* yield substitutes of somewhat inferior quality. The petioles of the leaves of

Caryota urens gives the *Kitul* fibre. Leaves of Agave, and *Furcraea gigantea* also yield strong fibre. ['Coir' fibre is from the husk of the coconut, fruit. Jute is from the stems of the plant *Corchorus capsularis*, and hemp from *Cannabis sativa* — the "Deccan hemp" from *Hibiscus cannabinus*.]

IV. Oil Seeds :

Oils of economic importance are furnished by seeds of certain species of forest trees. *Bassia latifolia*, *B. longifolia* and *Sal* seeds yield oil useful for cooking and burning. "Kokam butter" used for ointments is got from seeds of *Garcinia indica*. Oil of medicinal value is yielded by *Pongamia glabra* and Neem seeds. Though the seeds of the Burmese tree *Taraktogenos kurzii* form the source of the true "chaulmugra oil" used for leprosy and skin diseases, those of the South Indian tree *Hydnocarpus wightiana* are largely in use for bad skin diseases. Seeds of *Givotia rottleriformis* yield an oil suitable for lubricating fine machinery, and of *Vateria indica*, a butter known as "Pineytallow," useful for making inferior candles. (*Myristica canarica* also yields a similar fat.) 'Oleum nigrum' is yielded by *Celastrus paniculata* seeds.

V. Tans and dyes :

(*a*) *Tans :*

Tannin is an organic substance having the property of combining with albumen and gelatine to form an insoluble compound capable of resisting decay. Raw hides treated with tannin, thus get converted into leather. Its other property of giving a black reaction with iron salts is made use of in the manufacture of ink. It occurs chiefly in barks (the inner part), certain fruits and leaves, and in the galls formed on leaves and stems by insects.

The most extensively used indigenous tanning barks in this presidency are those of *Cassia auriculata*, *Cassia fistula*, *Acacia arabica*, and certain mangroves Due to an increase in the imports of South African Wattle * bark at cheap rates, and a general depression in the tanned hides market, there has been a considerable fall in the price of the indigenous tan barks.

The heartwood of *Acacia catechu* and of *A. Sundra*, yields the "Cutch" of commerce. The leaves of *Anogeissus latifolia* ("Sumach"), and *Emblica officinalis* are rich in tannin.

Among the principal tan fruits are the (chebulic) myrabolans, which form next to 'sumach' the most important pyrogallol tan of India. Out of the average annual export of about 75,000 tons of the tanstuffs of India, the myrabolans alone form 80%.

(*b*) *Dyes :*

The use of indigenous stuff for dyeing in India is dying, due to severe competition by synthetic products and imports. "Kamela" (the red powder got from the glands on the fruits of *Mallotus philippinensis*) was a regular source of revenue in the Ganjam district upto about 1898, but the revenue became fitful thereafter. Samples sent in 1900 to Germany were favourably reported on but, in the face of synthetic dyes the prospect of trade in this and similar Indian dyes became gloomy and unpromising.

Dyes are yielded from certain barks (the outer part), wood, roots, leaves, flowers, fruits and seeds. Many tanning barks and wood-extracts are also used for dyeing.

The chief *bark* dyes are: *Acacia arabica*, *Terminalia tomentosa*, *Hardwickia binata*, and *Morinda*

* Acacia decurrens, *var.* mollisima, giving about 30% tannin.

tinctoria. The *wood* of Red Sanders (*Pterocarpus santalinus*) yields a salmon-pink dye ("santalin"); of † *Caesalpinia sappan* and *Adenanthera pavonina* a red dye; of Jack and *Berberis* spp. a yellow dye. The *leaves* of *Terminalia catappa*, *Wrightia tinctoria*, and *Lawsonia inermis*, are dyeing agents. "Litmus" dye is got from lichens. Among dye *flowers* may be mentioned the Pomegranate, (red) *Cedrela toona*, (yellow) *Butea frondosa* (yellow), *Wrightia tinctoria*, (indigo). The pulp round the seeds of *Bixa orellana* gives the "Arnato dye" and the red glands around the fruits of *Mallotus* the "Kamela dye".

VI. Perfumes :

Perfumes are yielded by the flowers of *Michelia champaca*, *Jasminium* spp., *Gaultheria fragrantissima*, *Mimusops elengi* etc.

VII. Exudations from trees :

These are technically classified as under :—

A. *Gums* :

(*a*) *True gums* :
(i) Arabic kind (*Acacia arabica*)
(ii) Cherry kind (*Prunus cerasus*)

(*b*) *Pseudo-gums* :
(i) Tragacanth kind (*Sterculia urens*)
(ii) Dark or Moringa (*Moringa oleifera*)

(*c*) Astringent gums (*Pterocarpus marsupium*)

B. *Gum-resins* :

(*a*) Emulsive (Gamboge)
(*b*) Foetid (Asafoetida)
(*c*) Fragrant (Googul)

† The wood of this and the leaves of *Memecylon edule* are used in Malabar for dyeing reed mats.

C. *Resins* :

(*a*) Pale (*Vateria indica*)

(*b*) Dark (Black dammer).

D. *Oleo-resins* :

(*a*) Balsams (Wood oil)

(*b*) Varnishes.

(*c*) Turpentine and tar.

[*Gums* are soluble in water. Those that are insoluble in water, but absorb water readily and swell up into a mucilaginous mass are known as ' *gum-tragacanth.*' True gum-tragacanth is not produced by any Indian species. *Cochlospermum gossypium*, *Bombax* and *Sterculia urens*, however, yield a slightly inferior stuff known as *katira* or *Bassora* gum, and used by shoe-makers and in native medicine. *Gum-resins* are a mixture of gum and resin.

Resins are insolube in water, but soluble in alcohol. They are inflammable, burning usually with a smoky flame. True *dammar* is the resin from *Agathis* spp., a conifer not found in India. Resins produced by broad-leaved species in India are known in trade as ' dammar. ' *Oleo-resins* are resins containing an essential oil.]

The more important under the above sub-divisons are:

A. *True gums* :

Acacia arabica (Babul),
Ægle marmelos (Bael),
Azadirachta indica (Neem),
Anogeissus latifolia,
Odina wodier.

B. *Pseudo-gums* :

Cochlospermum gossypium,
Sterculia urens,
Bombax malabaricum (Red Silk-cotton tree).
Pterocarpus marsupium (Kino),
Butea frondosa (" Bengal kino ")

C. *True resins*:

Vateria indica (India Copal)
Shorea robusta (Sal)
S. tumbuggaiya.
Canarium strictum (Black dammar).
Ailanthus malabaricum ("Maddippal")

D. *Oleo-resins*:

**Hardwickia pinnata* (Malabar mahogany.)
Dipterocapus indicus (Wood oil tree of Malabar.
Boswellia serrata (— strictly speaking a *Gum-oleo-resin*; 22% gum 55% resin, 8% turpentine.)

VIII. Rubber:

This is found in the milky juice or 'latex' of a large number of plants belonging chiefly to the families *Euphorbiaceae*, *Moraeeae*, *Apocynaceae* and *Asclepiadaceae*. After collection or 'tapping,' the latex turns darker and coagulates sooner or later. To separate the rubber from the latex and prevent putrefaction resulting from a slow coagulation, the chief measures adopted are washing and kneading, boiling, separation by a centrifugal machine or treatment with acetic acid. 'Vulcanite' is made by a combination of rubber ("Caoutchouc") and sulphur.

The main sources of rubber in South India are the exotics *Hevea brasiliensis* (Para-rubber), *Castilloa elastica* and *Manihot glaziovii* (Ceara-rubber). Of these, the first mentioned has proved the most profitable for planting. The chief plantatious in South India are on the Nilgiri, and the Tinnevelly, Districts, and in Travancore.

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* Tapped in South Kanara and Tinnevelly districts. A tree yields from 6 to 24 gallons of oil; locally used as wood preservative; Rs. 12 to Rs. 14 per four gallons, in South Kanara. It is believed that trees can be tapped biennially, or preferably, at longer intervals.

IX. Drugs, spices, etc. :

Medicinal *barks*	: *Soymida febrifuga,*
	Cinnamomnm zeylanicum.
	Holarrhaena antidysenterica.
	Careya arborea.
,, *leaves*	: *Cassia augustifolia* (Tinnevelly senna).
	Cassia alata.
	Neem.
,, *fruits & seeds*	: * *Strychnos nux-vomica.*
	Caesalpinia bonduc.
	Cassia fistula.
	Ægle marmelos.
	Abrus precatorius.
	Cardamoms.

X. Edible products :

Fruits : Jujube, Cashew-nut, Bael, *Emblica officinalis*, *Spondias mangifera* (Hog-plum), *Carissa carandas*, *Ficus* spp., *Syzygium jambolanum* (Black plum) ; *Seeds* : of † Bamboos ; *Flowers* of *Bassia* ; *Sap* from the *Palms*, *Phoenix*, *Caryota*, etc. Certain fungi and lichens are also edible.

XI. Animal Products :

A. *Lac :*

This is a resinous incrustation on the twigs of various trees, produced by a minute insect. It is used in the manufacture of gramophone records, varnishes, sealing wax, lacquer work, etc.

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* The seeds of *Strychnos nux-vomica* are an important item of minor Forest Produce in this presideney. The Nellore seeds are said to be superior to those of the West Coast.

† The simultaneous flowering (followed by the setting of seeds) of certain species of Bamboo over large areas in 1896 considerably alleviated the severity of the famine that occurred that year, in India.

Of all the minor forest produce, the demand for lac and lac products has been, of recent years, extremely unstable, due especially to serious competion by nitro-cellulose and other synthetic substitutes.

A lac research institute has been founded at Ranchi, in North India, to conduct research in the natural product, and a special officer has been appointed in London to investigate and stimulate the demands for lac and shellac. In the Madras Presidency, for some years, lac cultivation was being done on a large scale in North Salem, Madura, North Coimbatore and Palghat Divisions, but owing to the depression in the lac market, lac operations are, at present, very restricted, and it has been found profitable to convert the lac into sealing wax and wood-polish and offer these for sale. Last year, the jail department purchased (from the Forest department) its requirements of shellac for making superior sealing wax. and the Inspector-General of Prisons has agreed to purchase, for all the jails, their requirements of wood-polish, from the Forest Department, the stuff having been found to be as good as any imported one.

B. *Honey and wax* :

Honey is collected from flowers and stored in combs, by different species of bees particularly where large trees and rocks abound. It is separated from the wax by letting it drip out of its own accord through a sieve, or by squeezing it out through a cloth. Where bees are artificially reared it is extracted by a centrifugal machine which leaves the empty comb intact, and saves tbe bees the trouble of making new combs.

Bees-wax is got by placing the empty combs in boiling water, the wax melting and floating to the surface whence it is skimmed.

C. *Hides, Horns, Bones, Ivory, etc.*

XII. Mineral Products :

[Such as mica from Nellore, barytes (barium sulphate) from Anantapur, manganese from South Cuddapah.]

Appendix **A** gives a list of the more important items of minor forest produce, and the prices that ruled in a particular month in the markets noted against them.

In Appendix **B** is given a list of the forest divisions, with the chief minor produce extracted in each. The list also includes certain products that are, I think, worth an extraction.

APPENDIX—A

Quotations for Minor Forest Produce during November 1934.

Name of Produce.	Quality.	Rates in Rs.	Unit.	Name of Market.
1. *Cassia auriculata* (Bark)	I.	18 to 19	500 lbs.	Madras.
English : Tanners' Cassia	II.	14 to 16	,,	,,
Tamil : *Avaram*	I.	19 to 20	,,	Trichinopoly.
Telugu : *Tangedu*	II.	16 to 17	,,	,,
Hindustani : *Tarwar*	II.	9 0 0	,,	Rajahmundry.
	I.	10 0 0	,,	Vellore.
	II.	8 0 0	,,	,,
	I.	22 0 0	560 lbs.	Coimbatere.
	II.	20 0 0	,,	,,
2. *Cassia fistula* (Bark).		10 to 11	500 lbs.	Madras.
Tamil : *Konrai*				
Telugu : *Rela*	I.	9 0 0	,,	Vellore.
Kan. : *Kakke*				
Hind. : *Amaltas*				
3. *Wattle bark* (*Acacia* spp.)		90 to 95	Ton	Madras.

Name of Produce.	Quality.	Rate in Rs.	Unit.	Name of Market.
4. Myrabolams (Fruits).		25 to 30	500 lbs.	Madras.
Fruits of *Terminalia*		25 to 27	,,	Trichinopoly.
chebula,–the gall nut tree	I.	6 to 7	,,	Atur.
Tamil & Mal. : *Kadukai*				
Telugu : *Karaka*	I.	7 to 7½	,,	Shevroys.
Kan. : *Heerda*	I.	18 to 23	,,	Calicut.
Hind. : *Harra*	I.	25	560 lbs.	Coimbatore.
5. Nux-vomica (Seeds)		9 to 10	500 lbs.	Madras.
(*Strychnos nux-vomica*)		13 8 0	,,	Rajahmundry.
		8 to 10	,,	Vellore.
6. " Seekai "	I.	38 to 39	,,	Madras.
(*Acacia concinna* pods)	I.	15		Rajahmundry.
7. Soapnuts	I.	24	,,	Madras,
(fruits of *Sapindus*		50	800 mrs.	Rajahmundry.
emarginatus)		15 to 20	500 lbs.	Vellore.
8. Tamarind, shelled & seeded	I.	22	500 lbs.	Madras.
	II.	18 to 29	,,	,,
		18	,,	Rajahmundry.
		14	,,	Vellore.
9. Bees' Wax		200	,,	Madras.
		180	,,	Rajahmundry.
		130 to 140	,,	Vellore.
		225 to 240	,,	Calicut.
		230	,,	Coimbatore.
10. Dammar		40 to 45	,,	Calicut.
11. Deer horns		55	,,	Rajahmundry.
12. Samhhur horns		50	,,	,,
13, Divi-divi		9	,,	Madras.
(Pods of *Caesalpinia coriaria*)		10	,,	Vellore.

Name of Produce.	Quality.	Rate in Rs.	Unit.	Name of Market.
14. Cardamoms		620	500 lbs.	Madras.
		560	,,	,,
		330 to 335	,,	Calicut.
		375 to 500	,,	Coimbatore.
15. Nutmeg		220	,,	Madras.
16. *Beedi* leaves (Nagpur)		40	1000 boundles.	,,
Diospyros melanoxylon) Hyderabad	I.	27½	,,	,,
,,	II.	15	,,	,,
17, Charcoal				
(Krishnagiri)		0 15 0	Bag.	,,
(Kalahasti)		0 14 0	,,	,,
18. Ivory		4 to 6	1 lb.	Calicut.
19. Grain lac		41	Bengal maund.	Calcutta.
20, Pepper		130	500 lbs.	Madras.
21. Honey		125 to 140	,,	Calicut.
		90	,,	Madras.
		70	,,	Rajahmundry.
		9	Tin.	Coimbatore.

APPENDIX—B.

List of Forest Divisions and the chief minor Produce in each.

Waltair circle :

Ganjam	... Bark of *Cassia fistula* (Rela) : (*Acacia catechu*) ; 'Kamela' powder, etc.
Vizagapatam	... Bark of *Cassia auriculata* (Tangedu).
Godavari (Upper)	... Leaves of *Diospyros metanoxylon* (*Tumki*) ; 'Tangedu,' 'Sheekai.' Tamarind, honey, horns, etc.

Godavari (Lower)	... Seees of *Strychnos nux vomica* (Nux-vomica). Bark of 'Tangedu' and 'Rela'. Fodder grass, bamboos, etc.
Nellore	... Nux-vomica.
Guntur	... Fodder grass.
Parlakimedi	... 'Kamela' powder.
Bellary circle :	
Kurnool (East)	... Nux-vomica; 'Tumki' and Platter leaves (*Butea frondosa*).
„ (South)	... 'Tumki' and Platter leaves; 'Tangedu' and 'Rela' barks.
„ (West)	... Nux-vomica; slab quarries.
Anantapur	... 'Tangedu' bark; 'Tumki' & Platter leaves; barytes (barium sulphate—from Ganganapalle).
Cuddaph (North)	... 'Tumki' leaves; 'Tangedu' & 'Rela' barks.
„ (South)	... 'Tumki' leaves, bamboos, manganese —from Balapalle.
Salem circle :	
Vellore (East)	... "Divi-divi" pods. (*Caesalpinia coriaria*); Soapnuts, etc.
Salem (North)	... Lac, gall-nuts, 'Vembadam' bark (*Ventilago maderaspatana*), charcoal; Sandal oil?
Salem (Central and South)	... Gall nuts, 'Vembadam' bark, Charcoal, 'Tangedu' and 'Rela' barks Sandal oil?
Coimbatore circle :	
Madura	... Lac; 'Kasan' leaves (*Memecylon edule*).
Tinnevelly	... Oleo-resin from *Hardwickia pinnata*, Cloves, Cardamoms, Reeds for mat-making.

Kollegal	... Sambhur and Deer horns.
Coimbatore (North)	... Bamboos; sambhur and deer horns, honey, wax, gall-nuts; lac. Sandal oil?
" (South)	... Sambhur horns, Ivory, Cardamoms, gall-nuts, wax, 'Sheekay', honey; resin from *Ailanthus malabarica* ?

Ootacamund circle :

Mangalore	... Cutch (from *Acacia sundra*), oleo-resin from *Hurdwickia pinnata*, seeds of *Myristica canarica*, cardamoms, pepper, cashew-nuts, 'Sheekai', 'Naga' canes, Nux-vomica, Cinnamomum oil. Sandal oil?
Wynaad	... 'Kino' from *Pterocarpus marsupium*?
The Nilgiris	... Eucalyptus oil, honey, wax, horns, charcoal, fodder grass; oil from leaves of *Gaultheria fragrantissima* ?
Palghat	... 'Sheekai', lac; 'Usilam' (Leaves of *Albizzia amara*)? cardamoms, pepper, dammer, seeds of *Hydnocarpus wightiana*? gum of *Sterculia urens*?

APPENDIX—C.

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2. 'Indian Forest Utilization' — By, Troup.
3. "Quotations for Minor Forest Products" November 1934; — received from the Forest Utilization Officer, Madras.
4. Working Plan for S. Mangalore, etc.

A little red seed: the Malingerer's Friend.

When the Hindu child played the jewel game with Kim, he guessed the weights in "rutees".

"*Rutee*" or "*rati*" is I believe the North India name for the seed of *Abrus precatorius* — 'precatorius' because it is used for rosaries. The plant is a climber, and lives in scrub jungles.

Watt's "Dictionary of Economic Products" says much about *Abrus*; and, as usual, should be taken not too seriously, ("Give a weaverbird a thread, or an old wife a tale:— what a wounderful thing they make of it!") The seeds are red with a black patch at one end, and they are interesting as they are pretty! You are sure to find them in a carved sandalwood box, in the drawing room cabinet, in any retired Indian Official's home in England. Children play with them on wet Sundays; and their elders use them as counters for vicious pursuits, roulette, &c. People in India use the brown pods, with their red seeds, instead of holly for Christmas decorations.

The other day, I was in a forest in South India with a D. F. O. who is a Bengali, and an Assistant Collector, doing "forest training" — a young Mohammadan from Lucknow. We picked some seed capsules of the creeper, and got chatting about them. The D. F. O. told us their use in the jewel trade. *Abrus* seeds do not all claim to be quite equal; but this is strange but true:— any three seeds weigh as much as any three others. (We got the village jeweller to give us a demonstration that evening). The link with English weights is thus:— Two rutees equal a "carat", and a "carat" is the 24th part of an ounce, 3·16 grains. The words carat, and *rati* or rutee are connected, I believe. I said my piece about the seeds.

When newly picked do not give them to children to play with. Inflamed eyes, which are so common in India, are often due to children touching their eyes with their fingers after playing with rutees. An invisible something on the suface of the seeds affects delicate membranes.

What our Mohammadan told us may be known to Army doctors and N. C. Os., but it was new to me. Suppose you are a military hero but one that likes to take no part in battles; what can you do about it? Here is a receipt.

Soak some Rutee seeds for 24 hours, to soften them. String them together with a needle and thread. Afterwards, pull the thread out of the seeds, and keep it for use when need arises; it has soaked in some *Abrin* which is a powerful irritant. In good time before the Battle, get ready your 'doctored thread, and a needle. Make a little fold of skin on your knee, and stick the needle through and pull the cotton after it. Presently pull out the cotton. Your knee swells up; and it is difficult even to crawl to the Doctor, with this inexplicable ailment. He cannot help putting you on the sick list.

In case the army retreats, lose no time in curing the knee! You simply keep it in cool wet sand; the treatment takes an hour, they say.

ALYSON MINCHIN,
Indian Forest Service.

How the Walayar rogue elephant was shot.

The elephant developed murderous propensities just about the time that the Forest College camped at Walayar early in September last. The animal evidentally had a particular dislike for cattle graziers, for both the persons

it killed were herdsmen. One was a youth killed near Shollakarai on the 25th of August, and the second an old man on the evening of 10th September, about three miles from the Forest College camp.

While out with the students on the 9th morning, we came upon the rogue elephant, at about 9 o'clock, right out in the open on the 1935 regeneration area (Coupe IX); he did not mind us one bit, though we got to within 50 yards of him. However, when we did try to get closer, he turned round and looked at us hard, witb ears spread out, and I really expected him to charge at any moment. I cautioned the students te stand perfectly still, I had no rifle, and lucky for us the elephant eventually walked away in a most unconcerned manner. I, however, had an excellent opportunity of getting a good description of the beast and this is what I jotted down :—

Front foot :	16 inches in diameter.
Height :	About 8′ — 6″.
Tusks :	About $1\frac{1}{2}'$ showing ; cradle-shaped.
Head :	Rather angular and ears smallish in proportion to the size of the animal.
Condition :	Rather poor ; back-bone very prominent.

Permission from the Collector, Malabar, to shoot the elephant was received by me on the 14th afternoon and that same evening I went out on speck to the regeneration area, where the elephant was seen on the 9th morning and it was not quite 200 yards from this spot that the grazier was done in on the 10th. I did not see the rogue elephant, but ran into a large herd of wild elephants late in the evening: there was an enormous tusker in the herd carrying good tusks. The next day I sent out scouts

in different directions to locate the rogue, but without success. On the 16th and 17th I was away with the students at Sappal and returned to Walayar early on the 18th morning. That same evening, at about 4 o'clock, as I was about to have some tea, one of the scouts came running in with the information that the rogue elephant had been located quite close to the camp. I set out at once, in pelting rain, and after about three-quarters of an hour's walk came to where the elephant was. I was in lucks' way, as the beast was peacefully feeding, standing on an open sheet-rock surrounded by jungle, and the breeze most favourable. I left my four scouts on the cart-track and managed to get well within 20 yards of the elephant, I could not get closer as the jungle ended. The elephant, was broadside on and as I was thinking whether to take an ear shot or wait for a frontal one, a couple of the scouts evidently got panicky and ran down the cart-track just behind me. The elephant heard the patter of their feet and turned round like lightning and took a couple of steps in my direction! I was behind a small *Cleistanthus collinus* bush and for all the world it seemed to me as if the brute had his wicked little eyes focussed on me! I did not like the look of things nor did I like the shot —the elephant was facing me, standing slightly askew. However, there was no time to lose and I let him have it below the boss and with the shot he spun round, staggered for a second and then went down like a wet sack. The sheet-rock was fairly high and an abandoned quarry, and just where the elephant fell and was kisking about was a slight depresion, so that I was unable to see much of him. I, therefore, ran up towards him to give him the second barrel and as I went just glanced down at my rifle to see if the left hammer was cocked, but in this interval the elephant had managed to pick himself up and there he

was dithering about not more than 12 yards from me! Needless to say, I was both surprised and felt most uncomfortable, but lost no time in letting him have the left barrel in the left ear. With the second shot he lunged forward and practically slithered down the slope — but fortunately for me in a different direction to where I was, right in the open. I thought the elephant was going to cross the cart-track, so I ran on to the track, reloading at the same time, in order to cut him off. However, he kept to the forest and I could hear him going along, straight ahead and parallel to the cart-track, but very slowly. About a quarter-of-a-mile in front there was a reserve line, which I knew the elephant would have to cross, so I ran along in advance and took up my position on the line at a point where I guessed thc beast would appear. After about fifteen minutes I heard the elephant coming and adjustad my position accordingly. A few minutes later the rogue pushed his head out about 40 yards from me and there he stood in a very weak and dazed state. I walked rapidly towards him and, though he saw me approaching, he did not attempt to move off till I had got to about 25 yards from him. As he walked on to the reserve line I let him have it low down in the shoulder and he collapeed; another shot in the neck gave him the quietus. Near the spot where the elephant fell there was a deep nullah into which the very obligingly rolled and thus saved me the trouble and expense of digging a special pit to bury the carcass.

News about the death of the rouge elephant spread like wild fire and soon there were crowds of people coming from all over to view him.

My description tallied in every respect; the elephant actually measured 8′ — 10″ in height. What I did not

notice on the 9th morning was that he had a broken tail! the tusks mearured 3′ — 9″ and weighed 46 pounds, the pair.

While removing the tusks the following day, at least a dozen maggots were found in the vicinity of the brain! I wonder if this is normal and the maggots were just the larvae of the bot fly; or whether they had developed from some old wound and worked their way towards the brain, which accounts for the elephant turning a rogue! Any information in this connextion from those reading this article will be thankfully received.

R. H. M.

Camp-life.

By L. R. Sharma.

A forester's life is a nomadic and adventurous one. Unlike other people he has to pass a major part of his life, or at least, of service, under canvas rather than under well-built pukka houses. In the following few lines I shall be dealing with the experience of my first hill-camp, wherein readers will find how a slight silly mistake makes one suffer a lot. If chances permit I shall deal fully with the camp-life under various headings in the subsequent issues.

It was in June 1930, that the Old Bull of the Punjab (Mr. H. W. Hogg, Organising Commissioner, Punjab Boy Scouts Association) sanctioned my application and I was allowed to attend Axela course in cubbing at Murree-hills. The camp was to run from 22nd to 30th June and we were to report ourselves in the camp on the 21st afternoon. I left my home (Lahore) on the 20th evening and reached Rawalpindi early in the morning. Here I met the othe

members of the camp, and after an hour or two we all left in a bus for the Sunny Bank (Murree) where our camp was.

On our way most of us including myself were prone to vomitting which I think is a common trouble with the novice hill-visitors. This was aggravated by the cold drink we took on our way. (In reaching the camp we had tea and felt some relief.) It is interesting to note that the remedy against the vomitting tendency suggested by the local villagers is to keep an onion or two and go on smelling it on the way. The practice is very common in Baluchistan also.

Tents were pitched and 3 members were placed in each tent and a group of 6 members named according to the colour of the shoulder badge, was to work conjointly. Regular camp was to start from the next day ; hence none of us took care to dig trenches round the tent, nor to see whether the tent was properly pitched or not. By God's grace there was no rain at night and we had a sound sleep. Next morning we attended class till 11 A. M. ; then we were given the day's ration to cook and finish our meals and be ready for camp inspection at 3 P. M.

One was kneading the flour and another had just finished the frying of beans, when suddenly rain came on. The weather took such a sudden change that besides heavy rain, it began to hail and we had no other go but to stay inside the tents. Our flour tourned into liquid and had to be thrown away and the poor curry pot was filled completely with rain water (as according to camp rule wc had to cook in the open). Inside the tents too we had no rest. The rain water rolling down from the hill slopes began to pass through our tent and we had to

sit with our bedding on our heads instead of ourselves on the beddings. It rained constantly from 11·30 A M. to 5 P. M. Just imagine our condition, sitting in the tents without meals and with beddings on our heads. With a good deal of trouble we were able to make two half-raw "chappaties" at 3 P. M. and this had to be divided among the 6 members.

See how a slight silly mistake put us to a great trouble that day ; hence, a camper must always select his camp site carefully and after the selection must make the necessary arrangements. The camp-site should be near water and close to communications of some sort. But at the same time it must not be so close as to give a clear view of Camp to passers by. Beside the noise of the traffic causes a disturbance in the camp if it is very close to a road. Last but not the least is that the site must have some charming view.

Selection of tent-site is as important as the selection of camp-site. A tent must not be pitched directly under the trees and especially under those which are likely to suffer from lightning. It keeps the tent wet and there is dripping for sometime after the rain is over ; but to pitch a tent under the shade of a tree is good. The tent must be facing towards the leeward side of a wind and should be so pitched that the sun's rays can pass through it. Shallow places and places where there is growth of long green grass should be avoided because they are often marshy and during rains turn swampy. The place must be fairly level though a gentle slope is preferable, as it saves the trouble of digging trenches. While pitching a tent care must be taken to see that the pegs are placed in a straight line with the seems so that the strain may be direct and equal and not crosswise. During storm the

corner and guy ropes should be bushed, while in rain the ropes should be slightly loosened to allow for the shrinkage. As soon as a tent is set up trenches should be dug up, which though the last precautionary measure, is not of the least importance.

(To be continued.)

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EXTRACTS.

1. The Timber Trade of India :

More Teak exported in the Past Year—Decorative Woods that find favour.

By Sir Hugh Watson, Timber Advertiser to the High Commissioner for India.

INDIA, a continent in size and character with elevations ranging from sea-level to the highest hills in the world, with climates varying from desert to glacial, and a rainfall varying from almost none to over 200 inches, must naturally present a a great variety of tree growth.

Apart from some of the Dipterocarps, sal in India and eng in Burma, the most valuable timber species occur in mixed forest and the economy of the mixed forest with a low proportion of saleable species to the acre presents a difficult problem alike to the forester and to the timber extractor. Extraction from a forest consisting of a single species, or in which all species have a market value, such as is usual in a temperate climate, is a straightforward proposition. Extraction from a mixed forest, where only a few species are saleable, is akin to harvesting ears of corn from a field of tares.

Under such conditions the economic radius for the extraction of the saleable species becomes limited, except in the case of those that can be borne by water. Hence teak, which by girdling three years before felling, can be rendered floatable is, and will remain, the principal Indian timber on the export market.

The Indian Forest Service has often been criticised for not having done more to develop the export market for Indian timbers. The critics, however, are apt to disregard the internal demand and the limitations that nature imposes on profitable extraction from hardwood forests containing an extensive mixture of tree species, and situated in difficult country.

Whilst there is a heavy internal demand for timber, the actual timber market in India is small—about two million cubic tons per annum—and confined to the towns and the main lines of communication. The requirements of the large rural population are chiefly for small timber and firewood. Where forests exist in their vicinity they have from time immemorial obtained

what they wanted without trade intervention. As the forests recede before the pressure of increased population and as industrialisation proceeds the internal trade in timber will increase.

The increasing internal demand and heavy freight charges restrict the timbers which India can afford to export to teak and the more expensive constructional and decorative timbers. It is only in the case of such timbers that the external demand is more remunerative than the local demand.

Teak, rosewood, satinwood and ebony in the form of furniture have appeared in Europe since the 17th century or earlier. Since the beginning of the 19th century they have been regularly exported as timber. Padauk from the Andamans was exported in the latter half of the 19th century; but it was not until after the war that any serious attempt was made to introduce other timbers to the European market. Of these, gurjun has found favour as a constructional and flooring timber; pyinkado as a flooring timber; and Indian laurel wood and Indian silvergrey wood as decorative timbers Other timbers that have evoked interest are Burma padauk, pyinma, toon, white mahogany, thitka, white chuglam, white bombwe, halda and kokko. The scarcity of kokko alone has prevented its increased tmport.

Exports of teak during 1934 were 41,353 cubic tons, as against 25 824 cubic tons in 1933. The value of other woods exported was about £ 29,000 in 1934 compared with about £ 23,000 in 1933.

— *The Timber Trades Journal*, 26—6—35.

2. Kiln-drying of Woods with Ozonized Air :

This problem has recently been discussed by S. N. Kapur (*Indian For. Rec.*, 20, Pt. 13. Delhi : Manager of Publications, 1935). The method consists in drying wood in an atmosphere containing small quantities of ozone, and is based on the assumption that the constituents of the wood during the long periods required for air seasoning are subject to show oxidative changes, which transform the sap contents chiefly—and according to some authorities the wood substance as well—into more stable compounds, thereby making the wood less liable to shrink and swell with changes in the humidity of the surrounding atmosphere, and consequently, more suitable for high-quality work. In summing up the results of his investigations, the author says that woods containing oils and oleoresins, which are difficult to 'kiln-dry', are in no way benefited by the addition of ozone to the circulating air in the kiln; that the addition of ozone to the

air in the kiln does not accelerate the rate of drying of either resinous or non-resinous woods; and that timbers dried in an atmosphere of ozone, that is, 'artificially aged' do not show any greater stability towards changes of atmospheric humidity than those dried in a kiln without the addition of ozone.

— *Nature*, *27—7—35*.

3. Encroachment of the Sahara :

In a paper in the *Geographical Journal* of June, Prof. E. P. Stebbing directs attention to the serious threat to the West African colonies of Great Britain and France by the encroachment of the Sahara. This is due, not to climatic causes, but to the methods of agriculture pursued. Shifting cultivation is still the practice. A piece of forest is felled, the timber burnt and the ground is sown and ultimately harvested. When the weeds become too heavy, or the yield inadequate, the patch is abandoned and a new one occupied. Thus the deciduous forest on the verge of the Sudan becomes degraded, more open and drier. Eventually savannah supervenes, which in West Africa is a term applied to bush or scrub. Herds of the nomadic shepherds then occupy and further destroy it. When its fodder value has almost gone, the herdsman cuts the scrub trees to get fodder for the goat. This is the last stage in the ruination of the land and the advance of the desert. Prof. Stebbing traces the degradation of the forest with the associated ruin of the land in a broad belt in Nigeria and elsewhere, and strongly advocates the need of reserving a belt of degraded forest at least some fifteen miles in width and more than 1,300 miles in length, in which tree growth could be improved and further destruction checked. Thus the advance of the Sahara might be stopped.

— *Nature*, *20—7—35*.

4. Daylight and Feeding of Birds :

The relationship between the coming and departing of daylight and the feeding of some common birds has been discussed by George Marples (*British Birds*, 29, p. 45, July 1935). He shows that the habit is a tolerably regular one, and that amongst the birds which begin to feed before sunrise (the time anteceding sunrise by from 42 minutes to 5 minutes) are the song-thrush, mistle-thrush, redbreast, barnowl, backbird, wren, blue tit. great-tit, chaffinch, house-sparrow; while such as begin to feed after sunrise include only the goldfinch, coal-tit and spotted flycatcher. A regular cessation of feeding in relation to sunset was also

observed. A peculiarity brought out by comparison of the times recorded is, that almost invariably blue-tits commence to feed before great-tits and finish feeding later, notwithstanding that they eat the same sort of food and the great-tit has a larger body to nourish.

— *Nature, 3—8—35.*

5. Welwyn Railway Smash :

How Teak Panels Withstood Shock.

At the opening of the Ministry of Transport inquiry into the Welwyn Garden City railway accident, the chief evidence was given by Mr. H. N. Gresley, chief mechanical engineer of the L. N. E. R. Mr. Gresley said that the last coach of the first of the two trains involved, which naturally bore the brunt of the impact, was crushed into a very small space. The vehicle was 60 ft. long and the whole of the frame was found embracing the front end of the engine of the following train. It was not broken, but it was "concertinaed." The body of the vehicle was shattered into four pieces. The engine carried the frame forward before coming to a standstill in about 140 yards.

" The impact caused the next coach to lose its bogeys, and the carriage fell over on one side. The front end of the carriage remained coupled to the next vehicle, and this was held up almost on its side, but not touching the rail. It was dragged forward some distance. Beyond these two carriages there was no damage done to the rest of that train. The reason was entirely due to the heavy steel frames and the buckeye couplings. I have not the slightest doubt that had the couplings not been of the buckeye type, there would have been more damage. If the last coach had been of steel panels instead of teak it could not possibly have withstood the shock, because the steel panels are thinner."

Replying to Colonel Mount, conducting the inquiry, Mr. Gresley said : " I think evidence as to the violence of the shock is afforded by the way in which the inch-thick steel frame of the locomotive was twisted and bent right back. No steel body would have been comparable with the strength of this main engine underframe."

— *The Timber Trades Journal, 29—6—35.*

6. How Furniture fashions have been changed :

With the greater utilisation of plywood and veneer, it has been said that this would mean an end to the hardwood trade, or at least that its members would have to enter the former

business in order to make a living, if they had not done so already. Reports constantly reach these shores that the trees yielding woods suitable for furniture and other decorative purposes are being rapidly depleted, that the tropics are becoming bare of hardwood trees, that prices for these must go up because of their increasing rarity, and that higher values of such timbers mean that cheaper substitutes will be used.

Immediately, accusing fingers are pointed at plywood, particularly when veneers of finely figured hardwoods are used as final surfaces for the various goods made of the materials. It was not so long ago that all furniture was made of solid mahogany, walnut or other decorative wood, but the prices asked were often beyond the means of many, and they had to wait until there was a sale of goods, or some kind relatives remembered in their wills where furniture they had possessed for years might find other homes which esteemed them even though the articles were second-hand.

Furniture of solid wood is still to be found in numerous homes where they often lend that air of distinction which is often peculiar to old furniture. Then, once these have been placed in their respective quarters, it required tremendous efforts to move them. Indeed. there are still many manufacturers who prefer to construct their furniture from solid wood, and find markets for them.

As one of them remarked, " A piece of furniture which takes six hefty men to move is a piece of furniture, but to-day's plywood constructions can be moved from place to place easily with one hand by any girl ! "

Warping of wood was a constant occurrence in the solid manufactures, which were often kept near windows where they may have been subjected to icy draughts and rays of the sun, or in other places where the heat of coal fires or radiators affected them. Plywood, owing to its construction. can practically be guaranteed against warping, even though it had to bear the effects of different temperatures. Now that plywood is obtained in laminated type, either with a wide softwood core or of a similar material to the outer surfaces but laid in narrow thicknesses, furniture built of such materials is proof against many of the deformities often arising in the solid timber. As one instance, a desk thus manufactured was seen in a place where it not only received the sun-rays or cold air through a window, but, owing to the small size of the room in which it was kept, was placed almost on top of an electric heater, but no sign of warping or other defect had occurred in the material even after it had been in this positiou for many months.

The use of plywood and veneers, too, has enabled the ordinary home-buildlng individuals, particularly those in flats, to purchase furuiture and cabinets of various kinds which would have been beyond their means not so long ago. Kitchen cabinets and those intended for holding clothes can now be had flnished in the white, so that purchasers may have been polished or painted to match any colour or decoratlve scheme; but it is in better-class furniture that there is greatest interest.

As buyers remark : How many people would know that these were not of solid wood?" Indeed, one would have to damage or cut deliberately into the wood in order to see that such material was not solid walnut, oak mahogany, or other decorative timber, but merely a veneer laid on a cheaper variety of timber. It is often seen in announcements that such and such furniture is of solid oak, mahogany or walnut, and it is merely the price which is a guide to this being the case.

The modern home-builder, it has heen said merely desires his furniture for a brief number of years, and it has been declared that ten years is a good estimate nowadays. The solid-looking furniture of old which lasted generations is no longer esteemed, except by collectors of antiques, it being recognised by many that there are fashions in furniture to-day as there are in many other articles. One has merely to glance at the catalogues of furniture dealers in tbe last few years to realise how designs and fashions have changed considerably.

It is because of plywood and veneers that designers have been enabled to show what can be done regarding furniture for all purposes, and buyers are soon attracted. Then, when other designs claims their fancies, other furniture is purchased. With the older modes, there was much deep thinking and examination of pass-books before changes were made; but, with the lower costs of to-day and the many designs to choose from, furniture and cabinets are more frequentiy changed. This, of course is all to the good of the furniture, plywood, veneer, and allied industries, and means more employment.

— The Timber Trades Journal, 6—7—35.

7. " High Lights " of the Paris Conference–Action on an International Scale to counter attacks on wood :

A conference was organised by the Comite International du Bois—C. I. B. for short—specifically to deal with the question of timber propaganda, and the importance attached to it by trade leaders in wood-producing and consuming countries may be gathered from the fact that it was attended by some sixty

delegates representing no fewer than eleven nations. Trade history was made, for the conference was unique, alike from its specialised nature and from the close application to a matter of international interest.

Conference sessions were lengthy, but brimful of interest. At the end of the discussions a number of resolutions were submitted and approved. These may be summarised as follows :—

(1) That this conference, comprising representatives of eleven nations, wishes to place on record its opinion that substitution by other materials for wood has reached proportions which represent a grave menace to the industry.

(2) That this conference, having considered certain evidence put before it, cannot escape the conclusion that propaganda designed to discredit wood is frequently inspired upon an international basis.

(3) It is resolved, therefore, to urge upon all countries interested in the production or sale of wood goods to set up forthwith bureaux for the specific purpose of timber publicity and propaganda. The functions of these bureaux might include :

(a) The tabulating of all available data relating to the utilisation of wood for construction or decoration.

(b) The tabulation of information which illustrates to an unusual degree the strength, durability, or beauty of wood, and alternatively, of appropriate information concerning any failure of substitute materials.

(c) The collection of photographic record of any unusual aspect of wood utilisation.

(4) It is resolved that the Comite Internationale du Bois shall set up a department exclusively devoted to timber propaganda and publicity, and shall act as a clearing house for all information collected by national bureaux, and shall issue at intervals of six weeks a comprehensive bulletin, circulating such information in English, French and German.

(5) That the Propaganda Department of the Comite Internationale du Bois shall issue a questionnaire relating to such subjects as railway timbers, mining timbers, timber houses, wood and steel windows, so that all data shall be co-ordinated and be at the disposal of member countries. (A full list of the subjects which the conference deemed most important was drawn up by a sub-committee.)

Finally, it was resolved that literature, photographs, etc., connected with timber publicity and propaganda produced by any one member country shall be freely at the disposal of and may be used without copy-right fee by any other member country.

— The Timber Trades Jonrnal, 13—7—35.

8. Empire Hardwoods :

W. W. Howard Bros.' Market Survey.

The half-yearly timber market report complied by W. W. Howard Bros. and Co. remarks in reference to Western Australian woods that in the past six months business in jarrah and karri has been very brisk, the total figures surpassing all previous records. Prices are very firm indeed, with an upward tendency. Several new mills have been opened, and reports come to hand showing that they are all entirely full up with orders for many months ahead. During the first six months the actual increase in the aggregate of sales for the United Kingdom records a total of over one million feet board measure more than in 1925.

Alluding to Indian and Burmese timbers such as pynkado, silver greywood, Burma padauk, white chuglam, white mahogany and Burma mahogany, the firm state that if supplies of these timbers can be depended upon under ordinary commercial conditions, a vigorous business would result, and, 'indeed even in spite of the unfortunate conditions prevailing some improvement has occured since the beginning of the year.

Wifh reference to teak, throughout the first half of the year business has been moderate, but the methods in force in the teak producing countries are fatal to any expansion of general business. If producers were to revolutionise their methods so as to encourage distribution, and to meet the competition with other hardwoods, a complete change could be successfully achieved. Meantime, imports continue in limited volume. Values are steady.

For British Guiana greenheart the demand is not only maintained, but is steadily increasing.

For Japanese oak the demand has been maintained, and prices have eased somewhat of late. There still remains a considerable quantity of inferior quality wood which has an adverse effect on the market. Shippers would do well to consider the question of the sapwood in the higher grades, as it is causing many regular buyers to use other timbers.

— The Timber Trades Journal, 13—7—35.

9. The Significance of Soil Texture in Forestry, and its determination by a rapid field method :

By S. A Wilde, University of Wisconsin

Soil material may be divided into to fractions : coarse material, which includes partices larger than 0·05 mm. in diameter, viz. stones, gravel, and sand, and fine soil material, which includes particles smaller than 0.05 mm. in diameter, viz. silt, clay, and colloids. The separation of these two fractions is made by shaking soil with water and allowing the suspension to settle. After one minute, the coarse soil material has settled, whereas the fine soil material stays in suspension. The relative amounts of the coarse and fine soil materials determine soil texture, which is closely related to the distribution and rate of growth of the forest vegetation.

The coarse soil material represents the " skeleton " of the soil ; its function is largely limited to the physical support of plants, and it is practically inactive in plant nutrition. On the other hand, the fine soil material is the active portion of the soil, which through its absorptive and nutritive properties fulfills manifold ecological functions. It is the carrier of life in the soil, or as Stebutt says, it is the " soil protoplasm. "

The Influence of Soil Texture Upon the Natural Forest Growth.

The ability of soil to retain water depends upon the amount of the fine soil material present. The higher the amount, the greater is the soil moisture content, other conditions being the same. Since the soil pores are filled with either water or air, an increase in the fine soil material, and consequently in soil moisture, leads to a decrease in soil aeration. Finally, the fine particles are the chief source of easily soluble substances, which serve the trees as nutrients.

Thus, soil texture materially influences the three basic factors in forest growth : soil moisture, soil aeration, and soil nutrients. Because various tree species have different requirements for these three factors, their distribution and rate of growth are often closely correlated with the soil texture. In general, soils with a low content of the fine soil material, i. e. sandy soils, support only trees which have low requirements for moisture and nutrients. On the country, soils with a high content of the particles, i, e. loamy soils, support trees which have high requirements for moisture and nutrients.

In some cases the distribution of forest trees shows such a remarkable correlation with the soil texture that it has been noticed even by non-technical people.

On the other hand, there may be found in the virgin forest many instances where the correlation of soil texture and forest growth is masked by the influence of other factors, especially by the ability of forest stands to modify the environment Through a succession of pioneer and basic species, the forest stands adjust the soil to the requirements of the tree species which compose them. However, as soon as these pioneer species become established, they moderate the extremes of climate, particularly high temperature, with the canopy of their crowns, and accumulate mulch and humus which increase the water holding capacity and supply of plant nutrients of the soil. Thus they create conditions suitable for the establishment of white pine, which may gradually replace the pioneer species. Similarly, the modifying influences of other pioneer forest stands diminish the significance of soil texture and allow other species to succeed on soils with a relatively low content of the fine soil material.

Significance of Soil Texture in Forest Planting.

In artifical reforestation, the soil of a cut-over or burned-over area has no protection from wind and sun rays. Such soils lack, as a rule, the protective layer or mulch, as well as humus. Their readily available nutrients are leached away by rains which fall on the exposed barren surface. Under these conditions, the fine soil material becomes the decisive factor in the successful establishment of planted seedlings.

It should be understood that the planting possibilities depend not only on soil texture, but also on a number of other factors, such as exposure, ground water level, chemical composition of soil, particularly soil reaction, etc. The choice of species and their adaptation to different soil types also varies greatly with different climatic conditions. Therefore, the knowledge of planting possibilities in other regions is a matter of local experience, derived from observations of both the natural distribution of trees and the conditions in artifical plantations.

Importance of Soil Texture in Cuttings and Thinnings.

A knowledge of soil texture is essential in all silvicultural operations, especially in thinnings and selective cutting, since it greatly affects the intensity of cutting and the choice of species which should be protected. For example, it would not be profitable to improve by cutting an oak stand on soil which has less than 20 per cent of fine material, because the oak on such soil will not produce a satisfactory yield of timber. The only cutting which might be expected in this case would be for under planting the area with pine species.

In cutting for the underplanting, it is again necessary to consider the soil texture. The heavier the soil, the greater is the danger of excessive growth of competing ground vegetation when sufficient light is available Hence, a denser canopy of the thinned stand should be maintained in order to control the competition of weed species.

The Importance of Soil Texture in Forest Nurseries.

The nursery soil must have a sufficient amount of nutrients so that the seedlings do not suffer from undernourishment. Also, the nursery soil must have a fairly high water-holding capacity; otherwise the seedlings suffer from extremes in moisture content, even in nurseries with artificial watering. To satisfy these requirements, the nursery soil should have a rather high content of fine particles. At the same time, nursery soils with too high an amount of fine soil material are subject to heaving or freezing out of seedlings, owing to their excessive saturation in the periods of fall and spring frosts. Also, the seedling on heavy nursery soils suffer greatly through the breaking of the roots during the spring transplanting, since heavy soils often remain frozen at this time. In view of these facts, the most desirable content of fine soil material of nursery soil ranges from 15 to 25 per cent.

The application of commercial fertilizers in the form of mineral salts is at present a common practice in maintaining the fertility of nursery soils, particularly those of a sandy nature. Unfortunately, in applying fertilizers, as a rule too little attention is being paid to the fact that the introduced salts must be balanced in the soil by a certain amount of colloidal material.

If mineral fertilizers are applied to soils with an insufficient content of fine material, they remain unabsorbed by the soil. A considerable portion of the unabsorbed fertilizers is soon washed out of the soil by rains or artificial watering, while the remainder, being in free solution, often is more detrimental than beneficial to the seedlings, because of chemical injury to their roots. A thorough mixing of the fertilizers with the soil may prevent, to a certain extent, the chemical injury to the young roots. Yet only colloidal material provides the proper exchange reactions of fertilizers in the soil, and facilitates their assimilation by the seedlings. This is especially true during the first period of seedling growth.

Method of Determining Soil Texture.

The recent extensive reforestation program has directed many foresters into soil work, particularly in selecting planting sites, acquisition of land appraisal of tracts under forest crop

law, etc. Since these foresters often have had but little experience in soils, particularly in the determination of soil texture, the need for a simple and quick test for this soil property becomes especially important.

At the present time, the hydrometer method, devised by Bouyoucos, is the most suitable for forestry practice. Yet the price of the standard equipment. its weight, and the need of an electric current limits its use in field work. Because of this, the following adaptation of the standard hydrometer method is suggested for field use.

The soil is separated from gravel and other coarse material by passing the soil through an 18 mesh sieve, onto a piece of ordinary paper. A sample of approximately 40 grams of sieved soil is taken with a measuring spoon. Special attention should be given to filling the measuring spoon completely by packing the soil and then striking off just level full with a spatula. The sample is placed in a 125 cc. flask with a wide neck and approximately 1 gram of dispersing agent (sodium oxalate) is added, using a small measuring spoon that is filled level full. The flask is filled with water up to the 100 cc. mark. A rubber stopper is inserted and the flask is shaken vigorously back and forth 60 times by hand and then placed on a level surface. After exactly one minute, a tube 5.5 inches high and one inch in diameter is filled with some of the suspension to the 60 cc. mark. A small, specially calibrated hydrometer is immediately floated in the suspension in the tube, and the reading is taken as soon as possibte.

The maximum amount of the fine soil material which can be read on the scale is 35 per cent. If a content higher than 35 per cent is to be determined, one half of the normal amount of soil should be used in the analysis, and the results multiplied by two. The samples of very heavy soils should be left over-night in the shaking flasks, with water, to help in the dispersion of colloids. Under ordinary conditions, however, the percentage of fine soil particles higher than 35 per cent, has no special significance to the practical forester.

Since the temperature and quality of water used in analysis, affects to a certain extent the hydrometer reading, the hydrometer, before analysis, should be placed in the test tube with pure water to check whether or not the water level and zero mark of the hydrometer correspond. In case the zero mark is higher or lower than the water level, the difference must be subtracted from or added to the final reading. The difference due to temperature and quality of water does not exceed two divisions of the hydrometer scale.

In analyses it should be remembered that forest soils are not always uniform throughout the profile, and hence, the soil to the depth of about 4 feet should be carefully examined as to the distribution of the fine soil particles. First, the amount of the fine soil material must be determined in the upper soil layer. This layer serves as growing medium during the critical early period of seedling growth, and is especially important in nursery soils as the chief carrier of fertilizers.

If the upper soil layer grades into heavier material, it may be detrimental in nursery soils because of excess of water in the spring. In planting, however, a heavier layer occurring at a depth of from 1 to 2 feet determines quite largely the supply of water and nutrients, since the roots of planted seedling will reach this layer in a short time. Consequently, the amount of the fine soil material in this layer will determinc the selection of species for planting. If a heavier soil layer occurs at a depth of 2 to 4 feet, it will still have a pronounced influence upon the growth of seedlings.

Of course, this infinence will vary, depending on the depth of the heavier material, textural compositiou of the entire profile, and the age of the plantation. Therefore, in dealing with soils of this kind, no definite rule can be given, but in general, a heavier subsoil layer allows for more freedom in the selection of species for planting.

— *Journal of Forestry, May 1935.*

10. Effects of the 1934 Drought in the United States :

It was only to be expected that the American drought of 1934 would extend well into the growing season of 1935, in some parts of its extensive area, and this is proving to be the case. In a number of articles that have been issued by Science Service, the gradual contraction of the stricken area has been traced. In one such article, early spring rains in the Plains were mentioned, and a great excess from the Ohio Valley to the Gulf, sufficient to delay spring ploughing. On March 27 light rains were described as having eased the situation in the northern part of the western drought area; but dust storms were reported in the completely dry region in eastern Colorado and western Kansas and in Texas. On April 20 an improvement was noted in Texas and Oklahoma, and a hope on the part of tne forecasters in the Weather Bureau that western Kansas and eastern Colorado might soon be relieved by invading depressions. Articles dated May 1 and 2 showed that this hope had not been fulfilled, the area in question remaining to

represent the temporary "Great American Desert". A faint sprinkle of rain was described as having evaporated as fast as it fell in Dodgo City. In the relieved areas, the cold weather and sodden fields, and the resultant delay in farming work, were said to be accepted with complacency after the previous extremes of drought and heat.

Dust storms, leading to the loss of the cultivated surface soil, had become a commonplace occurrence in the United States before the drought had nearly reached its greatest extent, causing great inconvenience and material damage to the States lying to the eastward of the driest region, as well as to western farmers. The drought itself is held, however, to be only partly responsible, as the dry soil would not have been blown away had the Plains not largely been deprived of their former permanent grass covering, of which the roots would have bound the soil in place through even the worst periods of deficient rainfall. Another article describes one of the processes whereby the drift of loose soil has been to some extent countered. This process, known to farmers as 'listing'. consists of specially deep ploughing with the aid of motor-driven tractors. A special plough is used, which throws the soil on both sides; the furrows may be as many as fifteen feet apart, and are driven at right angles to the prevailing winds, which are generally from the north-west. Where the soil is heavy the tops of the ridges are covered with something more coherent than the normal surface tilth, and this parly accounts for the efficacy of the method, which, however, is due mainly to the fact that as the loose soil begins to move under the action of the wind, it tends to fall into the furrows and to be trapped in them. It is stated that the Soil Erosion Service does not regard this 'listing' as a solution of the problem of wind-erosion, the real solution being to restore the permanent grass, much of which was ploughed up during the War so that cereals could be grown.

11. Symbiotic Association between Flies and Nematodes in Galls of Eucalyptus Trees :

Galling of the flower buds of certain trees in Australia, notably *Eucalyptus rostrata* and *E. hemiphloia*, is sometimes so heavy that no flowers appear, and no honey harvest is reaped. The chief causes of galling are agromyzid flies of the genus *Fergusonina*, Malloch.

Inside the galls the fly larvæ are associated with small nematodes, which I have placed in a sub-genus of the plant-parasitic genus *Anguillulina*. The nematodes live in the

gall cavity in contact with the fly larvæ, and ultimately a number of fertilised females enter the body-cavity of the female larvæ of of the fly. There eggs are laid, and when the female fly in turn deposits its eggs in young flower buds a number of larval nematodes accompany them. The nematodes at once feed on the plant tissues and give rise to proliferating cells on which the fly larvæ feed, making hollows in which they are associated with the worms.

The symbiosis appears to have arisen as an accidental association between agromyzid leaf-tunnelling larvæ and plant parasitic nematodes.

Goodey has described a parasitic assoication between the frit-fly of oats and a nematode, which may correspond to one of the steps in the evolutionary series which led to the highly organised associatlon outlined above.

— *Nature, 17—8—35.*

12. Teaching the Value of Forests :

One of the troubles in connexion with forestry and afforestation in Great Britain is the loss by the population of what, for want of a better term, has been termed the ' forestry sense'. Out in the Empire the difficulties of the forest officer arise from other causes. In each case it is sought by propaganda and education to teach the people the true value of the forest and its position in the economic structure of nations and the lives of the population. The Forestry Department in Trinidad is issuing a series of Forestry pamphlets " for teachers." * * *

The director writes : " The Forestry Act of 1919 authorised the formation of large State Forests and has thus broadened immeasurably the basis of forest ownership. Every man is now an owner of plantations, and should have some idea of how and why they are created and maintained. Such problems as the relative values of broad-leaved trees and coniferous trees as forest crops, and the scenic effect of planting introduced species along with native trees, which are now freely discussed in the Press, can only be understood in the light of at least a minimum of knowledge of the species concerned and of their relation to forestry in general." The exhibits are set out under the headings : Welsh forest botany, forest operations, forest pathology, wood anatomy and utilisation of forest produce. Among interesting exhibits are those relating to the beautiful woods of the Wye Valley, afforestation of sand dunes in South Wales, and the well-known plantations at Lake Vyrnwy, the

chief reservoir for supplying water to the city of Liverpool. Those plantations now amount to 4,500 acres out of the total area of 5,000 acres which it is proposed to plant.

13. Longevity of Fungi :

An interesting paper describing experiments on some ancient cultures of fungi, has recently appeared, " On some Saccharomycetes and other Fungi still alive in the Pure Cultures of Emil Chr. Hansen and Alb. Klocker ". Winge used cultures 16–17 years old, whilst Hjort. continuing the same investigation, had cultures 31 years old. The Carlsberg Laboratory possessed the original pure cultures, and these have now been tested for vitality be the authors of the paper under review. The oldest living cultures, of a species date from 1886—a span of forty-seven years, whilst another had retained vitality for forty-five years in 1934. Solutions of 10 per cent saccharose or beer wort were the culture media employed, whilst Pasteur flasks reduced evaporation to a minimum.

— *Nature, 24—8—35.*

COLLEGE NOTES.

1. Camp notes : Walayar :— (Sept. 1935) :

The weather this year was in striking contrast to that of the last year. As there had been heavy showers on most days, we never experienced the previous year's water-scarcity and the Walayar stream from which we had to draw water for our necessities was in flood. Two noteworthy incidents of this year's camp were our encounter with a rogue elephant, and our excursien to 'Lost Valley' of Palamalai forests in Palghat Division, to study the sleeper operations — a deviation from the usual programme of the camp.

The rumour of the presence of a wild elephat in the vicinity of camp which had become a menace to the peaceful life of the people of the adjoining villages was the first to greet over ears on arrival in this camp. The report that a cooly had been done to death by the animal only aggravated our fears; but a chance to get a glimpse of the rogue in his wild state was one of the most fervent desires of many. This happened on 9th September.

The morning had been raining heavily and on 9th October when the sky became clear for a little while, it was with great reluctance that we proceeded to R. A. 1935 to finish our survey work. The narrow foot path leading to the R. A. showed fresh foot marks of a solitary elephant and it was with great diffidence that we advanced looking very keenly on either side fearing an unexpected encounter. As soon as we emerged out of the narrow foot path into the open, we were suddenly stopped

by the cry of 'elephant' by those who were walking ahead. Since the elephant's back was tourned to us, we were able to proceed some distance without ourselves being immediately perceived by the animal. There, about 75 yards in front of us stood the rogue elephant unaware of the eager, but of course frightened, look of us, frolicking and feeding comfortably in the cool morning atmosphere. We refrained from molesting him by producing any noise, in order to watch is movements and to have a clean view of him as long as possible. But a instinctively and perhaps feeling the presence of some hostile strangers, he turned and gazed at us for a few minutes, thus affording a distinct view of his front side. It was a majestic look with his raised head, exhibiting fully the two beautiful and symmetrical tusks which of course were discoloured with mud. Suddenly he twisted his tail as if a charge was contemplated at which many of us fell back slowly, ready to take to their heels in case of a pursuit. After gazing for a few minutes he turned with contemptuous disdain and walked slowly and calmly away with a dignified pace as the uncrowned monarch of the jungle still displeased at the intrusion of the unwelcome visitors to his domain. But the ideas which intimidated and made him refrain from such a course must ever remain a mystery. The very next day we were shocked at the news that a grazier had fallen a victim near the elephant's favourite haunt in R. A. 1935.

The foot prints of his fore legs measured 1′ — 4″ and according to the calculation the estimated height of the animal was about 8′ — 6″. As it became a menace to human life it was proscribed and its fate was thus sealed. On the 18th September the animal was traced close to the camp and was shot dead by Mr. R. H. Mitchell, the Second Senior Instructor, an expert shikari,

upon whom thc people showered their praise for the service rendered to them. The tusks weighed 44 lbs. and measured 4′ along the outer curve. This could not be considered as a maximum growth in view of the size of the animal. The most curious and inexplicable thing that was observed while hewing down his head, was the presence of some big maggots safely lodged in the skull. Uufortunately they were not collected and preserved.

The excursion to Palamalai forests to study sleeper operations in the Lost Valley was another interesting episode of the last Walayar camp. After visiting the Palghat Match Factory on the 16th September we motored up to Dhoni, where we visited the experimental plots along with the Research Range Officer. Several experiments had been conducted with regard to the regeneration of the important timber species though the results were inconclusive and uncertain in most of the cases. From Dhoni began the climb up to Sapal. As the distance was short and the ascent properly graded, it never seemed a tiring one in the evening time. By the time we reached Sapal, making our observations about the *Swietenia macrophylla* plantations, and the common species occuring on either side of the path, the servants had gone in advance and made the necessary arrangements for our stay.

Early next morning we resumed our march all in exhilarating spirits. The walk along the side of Elival hills clothed in rich verdure of evergreen vegetation was very pleasant. The regeneration of the evergreen species especially *Mesua* was marvellous. Giant trees of *Hopea, Mesua, Bischoffia* were not uncommon. The last six furlongs of ascent to reach Palamalai Bangalow was a little bit difficult. Our attention was attracted by the

beautiful gregarious patches of (*Palaquium*) just below the Palamalai Bungalow, where natural regeneration of the species was very abundant. A few *Cullenias* also occupied the top canopy here. As we reached the top the vegetation gradually changed to grass with dense growth of under shrubs such as *Wendlandia* and *Symplocos* and that was most striking all round the Bungalow.

The Palamalai Bungalow situated on the top of the hills remote from any habitation and surrounded on all sides by evergreen forests afforded one of the most beautiful panoramic views of the surrounding country interspersed with woodlands and low lying fields, and the sight was simply grand and enchanting. The incessant and awful howling wind would have even blown away the roof of the building had it not been secured by wire ropes to pillars sunk in the ground. The climate is bracing and cool here even in the hottest part of the year. After a few minutes rest in the bangalow an hour's walk crossing the Palamalai ridge brought us to Lost Vally where sleeper operations were carried en. The vegetation on the top of hills shewed a predominance of shola species, the most common representatives being *Symplocos*, *Elaeocarpus*, *Hypericum*, *Maesa*, *&c*.

Coupe IV was the area worked this year. *Mesua* trees over 6½′ girth were felled and converted to sleepers. *Mesua* growth was observed to be marvellous. The gigantic trees which had been growing for the last many decades were felled which on conversion yielded a few sleepers, resulting in a high percentage of waste. This would apparently sound to be a poor economic undertaking. But it is justifiable in the sense that these trees if left to themselves would die out naturally without yielding this small return. After studying the various

operations in connection with sleeper conversion we began our climb down. The drag path along which the sleepers are taken down by coolies, was selected as the short cut to Olavakot and under the guidance of the forest watcher deputed by the Range Officer, the journey was commenced by about 3 P. M. It turned out to be the most difficult portion of our journey. The steep and slippery hill glopes interspersed with rocks and boulders and crossings of streams having almost perpendicular rocky banks where any casual slip would have landed us straight into kindom come, gave a good experience in mountain climbing. The stray and casual plants found here and there along the foot path gave the much needed support to the weary hand. The slender poles thrown across deep streams which rushing down the steep rocky bed gurgling and foaming as the only posible connecting link between the two sides, would make one's head reel and legs tremble at the idea of crossing. Thanks to God, we reached the plains without any mishaps, though chances for them were not few on the way. The courage of desperation more than any adventureus spirit drove us on to finish the course. From the foot of hills, along the forest road, paddy fields and Railroad was a regular wearied march at night. When we reached Olavakot by 10-30 P. M. the hotels there, were found too inadequate to satisfy our rapacious appetite and the greediness with which one rivalled another in procuring eatables was astonishing. Under the able guidance of the Second Senior Instructor who evinced solicitous interest in looking after our comforts, we had a very interesting and instructive excursion.

N. S. PILLAI,
Senior Division.

2. M. F. C. Athletic Club.

It is a little too early to guage correctly the strength of this year's Hockey team. But it can justly be stated, that in the departure of the Seniors, the Foot ball team has suffered a little, due to some of its able players having gone out. It will be interesting to note, that the standard of Cricket this year, has risen somewhat and consequently, our activities, this term, were mainly directed towards giving the Cricket players, the utmost practice.

We played a number of Cricket Matches, one with the Coimbatore Cricket Club, another with ths Agricultural College and the third with the Government College; we also entered for the Y. M. C. A. Cricket Tournament and put up a rather strong fight, some of our players, getting into perfect form now and then and exhibiting a bit of good game occasionally ; but as regards the results, suffice it to say, that excepting in the match with Government College, we lost about as many as we attempted to win, all in good humour.

K. R. Radhakrishnan.

Notifications Relating to Rangers.

Waltair Circle.

28—8—35. Mr. S. M. Ansur Ali, posted to Lakkavaram Range, Godavari Upper Division, in relief of Mr. C. S. Sivagnanam (M. R H.)

30—8—35. Mr, P. Gopalam, granted extension of leave for two months from 14–8–1935 in continuation of the leave for three months already granted,

5—9—35, Mr. M B. Madappa, M. R. H., Forester First grade to act as Ranger last grade from 14–8–1935 *vice* Ranger P. Gopalam granted extention of L. A. P. for *2* months.

27—9—35. Mr. P. Chengalreddy transferred to Guntur Division to Bezwada Range, 2. Mr, P. Dhananjayarao, posted to Vinukonda Range and will hold charge of Bezwada in addition until relieved by No. 1. 3. T. Naganna is posted to Marrigudam temporarily and will relieve No. 1 expeditiously.

27—9—35. 1. Mr. P. Gopalam, on expiry of his leave, posted to Bhadrachalam Range, Godavari Upper Division. 2. Mr. M. Narasinga Rao Naidu on relief by No. 1 is posted to Surada Range, Ganjam District. 3. Mr. Ahmad Sherif, on relief by No. 2 posted to Marrigudem Range, Godavari Upper Division.

I—10—35. Mr. A. Tirupatirayudu, granted extention of L. A. P. for two months in continuation of the leave already granted.

3—10—35. Mr. M. A. H. Kirimani Sahib, granted further extension of leave for three months from 19–9–35 in continuation of the extension already sanctioned.

15—10—35. Mr. P. Dhananjayarao, Bezwada Range, Guntur Division, granted leave for two months with effect from date of relief. 2. The Ranger will also be permitted to draw during the leave period the pony allowance he is now drawing as he is likely to return to a post carrying this allowance. This sanction is subject to the proviso that a pony is actually maintained by the ranger during the period of his leave,

15—10—35. Mr. D. Krishnaswamiah. Palnad Range. Guntur Division granted leave for two months with effect from date of relief. 2. V. Parthasarathi, Forester First grade posted to Palnad Range *vice* No. 1 on leave or until further orders.

1—11—35. Mr. J. D. Theodore, Guntur Division, granted leave for three months from 13–9–1935.

2—11—35. Mr. B. Kotilingam, on return from leave on 10–11–1935 posted to Bezwada Range, Guntur Division.

Bellary Circle.

5—9—35. K. Purushothama Rao. Anantapur division granted extension of leave for 2 months from 21-8-1935,

11—10—35. 1. Mr. D. N. Subrahmanya Iyer, Kadiri range, Anantapur division posted in additional charge of the current duties of Bukkapatnam Range *vice* No. 2 below temporarily. 2. Mr. A. Seetharamiah, Ranger, Fifth grade Bukkapntnam Range Anantapur division granted leave for a period of two months from date of relief.

11—10—35. Mr. T. Paramasivam Piliai, Kurnool East division on expiry of his leave on 17-10-35 posted to Bukkapatnam Range, Anantapur division in relief of Mr. D. N. Subramanya Iyer, Range Officer. Kadiri in additional charge.

19—10—35. Mr. T. Paramasivam Pillai. granted extension of leave for one month from 18-10-35 in continuation of the leave already granted.

24—10—35. 1. Mr. N. C. Mahadevan Piilai, Sanipaya Range, Cuddapah South division granted leave for three months. 2. Mohammad Ansar Badsha Sahib, posted to Sanipaya Range *vice* No. 1.

Working Plans Circle.

15—8—35. Mr. K. Raghuraman, Ranger Sixth grade, Working Plans No. II Division (Cuddapah) Madanapalle granted leave on average pay without Medical Certificate [for one month with effect from 13-8-1935.

Salem Circle.

25—9—35. Mr. T. K. Parthasarathi Ayyangar, granted extension of leave for 1 month from 16-9-1935. and leave on half average pay for 5 months, in continuation thereof. 2. Mr. C. B. Pemmiah, Trained Forester Second grade, and Ag. Ranger last grade will continue to act as Ranger last grade *vice* No. I granted leave.

27—9—35. 1. Mr. T. S. Sankaranarayana Ayyar, Gudiyattam Range, Chittoor division, posted to Shevaroys South Range relieving Mr. M, Muthuswami Ayyar. 2. Mr. N. M. Ponnappa, Trained Forester Fifth grade, Chittoor division promoted to act us Ranger last grade (on new scale of pay) in the same division *vice* Ranger Syed Munavar recommended three months leave from date of absence (i. e., on 18-9-1935). 3. A, Yegnaswami, Trained Forester, Vellore East division posted to Tummampatti range. He will be in charge of the Range as Forester with increased Fixed Travelling Allowance of Rs. 13-2-0.

7—10—35. Mr. M. M. Ponnappa, Trained Forester Fifth grade, promoted as Ag. Ranger last grade on new scale of pay posted to Chandragiri Range in relief of Mr. B. V. Vaideswara Ayyar. 2. Mr. B. V. Vaideeswara Ayyar, Ranger, Fifth grade Chandragiri Range on relief by No. 1 transferred to Mamandur Range in relief of Mr, P. K. Subbanarayana Ayyar. 3. Mr. P. K. Subbanarayana Ayyar, Ranger Seventh grade Mamandur range on relief by No. 2 transferred to Gudiyattam Range in relief of Mr. T. S. Sankaranarayana Ayyar transferred to Shevaroys South Range of Salem Central division.

7—10—35. Mr. V. N. Parthasarathy Nayudu, Ranger Seventh grade transferred from the Working Plans to Salem Circle posted to Palmaner Range, Chittoor division, in relief of Mr. M. S. Krishnaswami Ayyar transferred to the Working Plans Circle.

9—10—35. 1. Mr. M. Pakiyanatham, on return from leave on 20–10–1935 posted to Chengam Range, Vellore West division. 2. Mr. M. V. Ganesan, Chengam Range on relief by No. 1 posted to Turaiyur Range relieving Mr, S. V. Doraiswami Ayyar, Namakkal Range now in additional charge.

9—10—35. Mr. Syed Munavar, Turaiyur Range Salem South division, granted leave for three months from 18–9–1935 the date on which he was relieved by Ranger S. V. Duraiswami Ayyar of Namakkal Range.

16—10—35. Mr. M. S. Krishnaswami Ayyar, Palmaner Range, Chittoor division, granted leave for four months from date of relief.

18—10—35. Mr. C. B. Ekambaram, Trained Forester II grade *sub-protem* transferred from the Ootacamund to Salem Circle promoted to act as Ranger last grade (new scale of pay), (*vice* Ranger R. Manickam Billai on leave) and posted to Tiruvannamalai Range, Vellore East division, in relief of Marcel D'Souza, Trained Forester Second grade and Acting Ranger last grade transferred to Ootacamund Circle.

3—11—35. Mr. R. Manickam Pillai, on return from leave on 1–12–1935, posted to Tiruvannamalai Range, Vellore East division, in relief of Marcel D'Souza, transferred to Ootacamund Circle.

Coimbatore Circle.

14—8—35. Mr. C. R. Raghunatha Ayyangar granted an extension of leave on average pay on medical certificate for two months from 1–8–1935 in continuation of the leave for one month from 1–7–35 granted to him.

14—8—35. Mr. M. Gopalaswami Naidu, Acting Ranger, Seventh grade Kollegal, will on his relief of Kollegal Range charge, be transferred to Tunacadavu Range, as Assistant Ranger. He

will act as Ranger Seventh grade in the leave vacancy of Ranger Mr. C. R. Raghunatha Ayyangar granted extension of leave till 1st October 1935.

7—10—35. Mr. G. Ranghunatha Ayyangar, granted extension of leave for two months from 1-10-1935 in continuation of the leave granted. 2. The existing arrangement will continue i. e. Forester Fifth grade Maragathavelu will continue in charge of Kodaikanal Range.

24-10-35. Mr. M. Gopalaswami Naidu, will continue to act as Ranger Seventh grade, in the leave vacancy of Mr, C. R. Raghunatha Ayyangar, granted extension of leave till 30th November 1935 inclusive, and to be Assistant Ranger, Tunacadavu Range.

Ootacamund Circle.

6—9—35. Mr. Thomas Thachil, Ranger on special duty in Nilam- division, transferred to Sultan's Battery Range, Wynaad division, *vice* Mr. K. Chaikku, Ranger Sixth proceeding on leave.

17—9—35. Mr, K. Chaikku, granted leave for four months, from date of relief.

3—10—35. Mr. P. A. Madhavan, Mudumalai Range. granted leave for four months from 10th November 1935 or date of relief.

9—10—35. Mr. K. M, Achayya Trained Forester, on the expiry of his leave on 17—10—1935 posted as Assistant to the Ranger, Amarampalam Range, Nilambur division.

16—10—35. Mr. K. R. Krishna Nair, Uppinangady Range, Mangalore South Division, gaanted leave for three months from date relief. 2. Mr. K. Kunhirama Menon, Puttur Range, to relieve No. 1 and hold additional charge of Uppinangady Range until relieved hy No. 3. 3. Mr. C. Vasu, on expiry of his leave on 3rd Novemher 1935 posted to Uppinangady Range.

23—10—35. Mr. M. S. Subbiah, Acting Ranger (last grade) on special dnty in Nilambur Division transferred to the Nilgiris as Assistant to the Range Officer, Mudumalai and then to be in charge of the same Range from 10th November 1935 in place of Mr, P. A. Madhavan, granted leave.

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